

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P363357

Luminaire Tested: NVN-SA5C-760-U-T4W-HSS

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P363357  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA5C-760-U-T4W-HSS  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(5) 70 CRI, 5700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 25772 lumens  
Efficiency: N/A  
Efficacy: 92.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G4

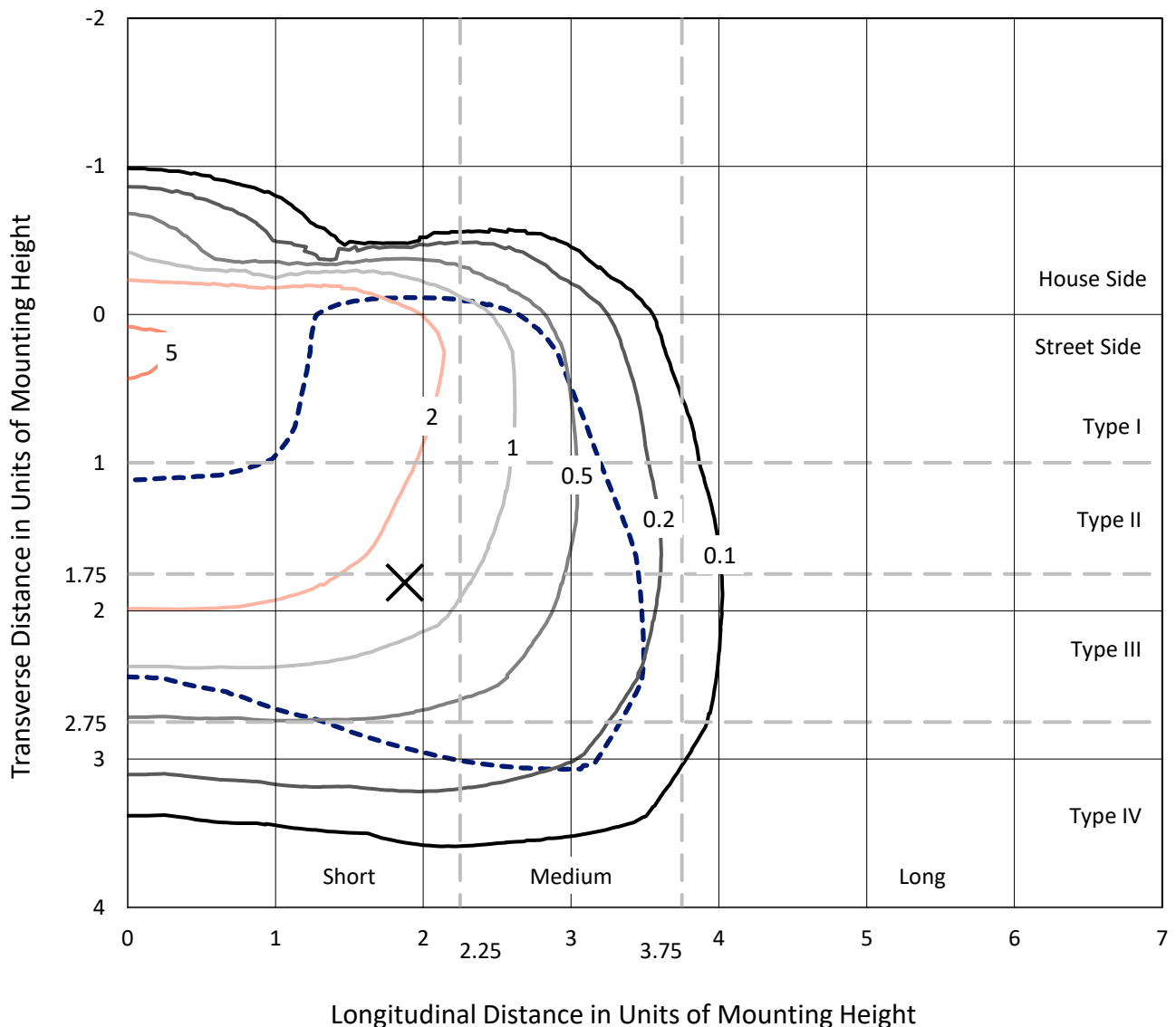
Input Watts (W): 279  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

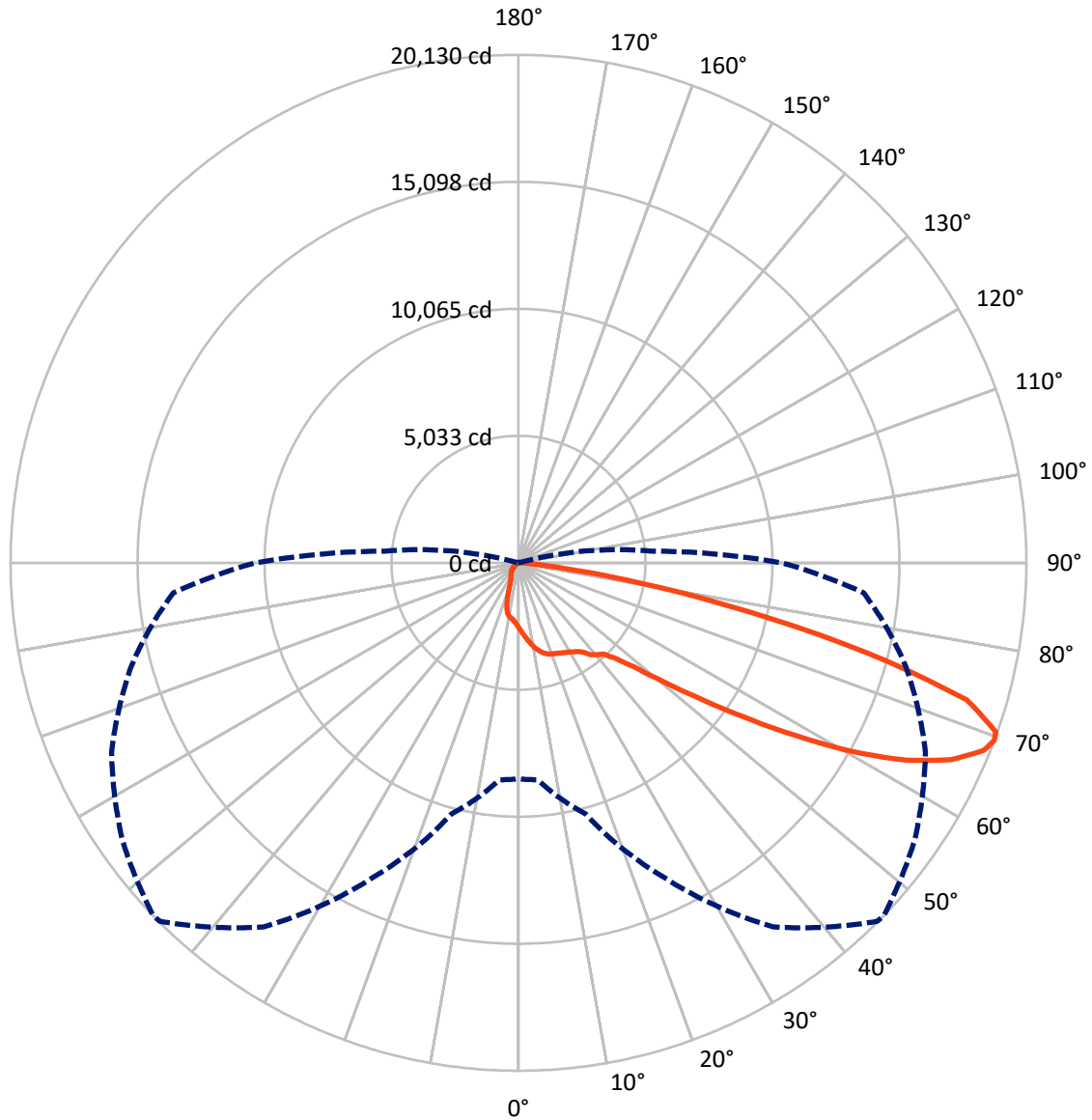
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 46-Deg Lateral      - - - Horizontal Cone Through 69-Deg Vertical

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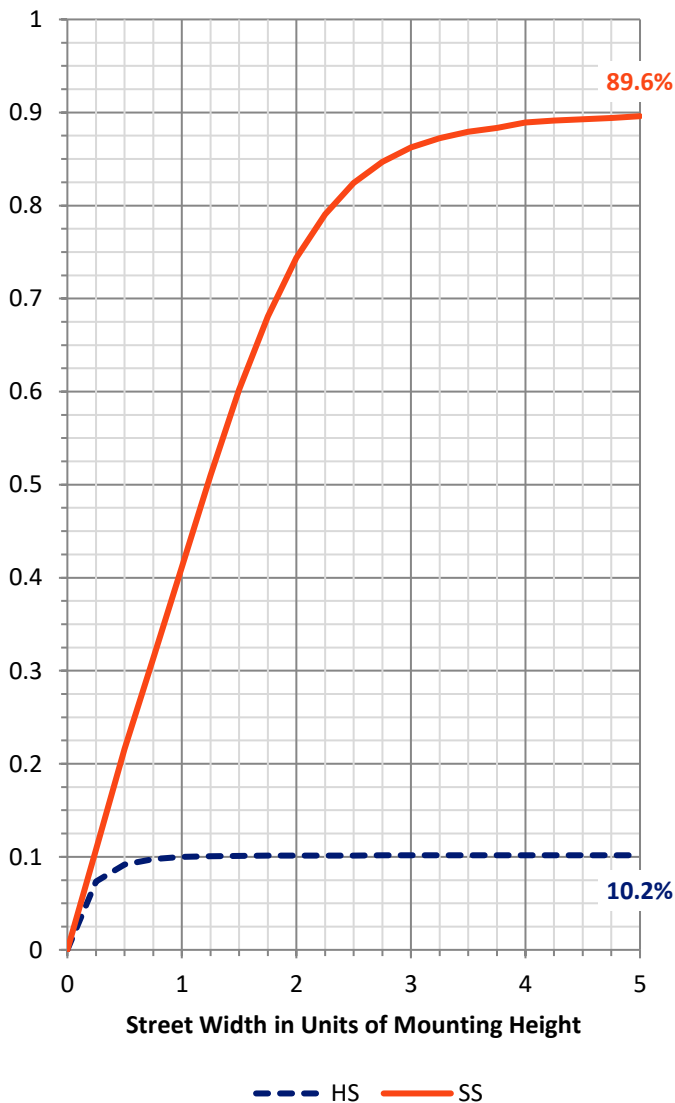
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2644.9   | 0.0    | 2644.9  |
|                    | % Fixture | 10.3     | 0.0    | 10.3    |
| <b>Street Side</b> | Lumens    | 23127.1  | 0.0    | 23127.1 |
|                    | % Fixture | 89.7     | 0.0    | 89.7    |
| <b>Total</b>       | Lumens    | 25772.0  | 0.0    | 25772.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 257.0   | 1.0       |
| 10°-20°   | 779.7   | 3.0       |
| 20°-30°   | 1226.3  | 4.8       |
| 30°-40°   | 1758.5  | 6.8       |
| 40°-50°   | 3039.3  | 11.8      |
| 50°-60°   | 6004.5  | 23.3      |
| 60°-70°   | 8391.8  | 32.6      |
| 70°-80°   | 4054.2  | 15.7      |
| 80°-90°   | 260.6   | 1.0       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 25772.0 | 100.0     |
| 0°-180°   | 25772.0 | 100.0     |

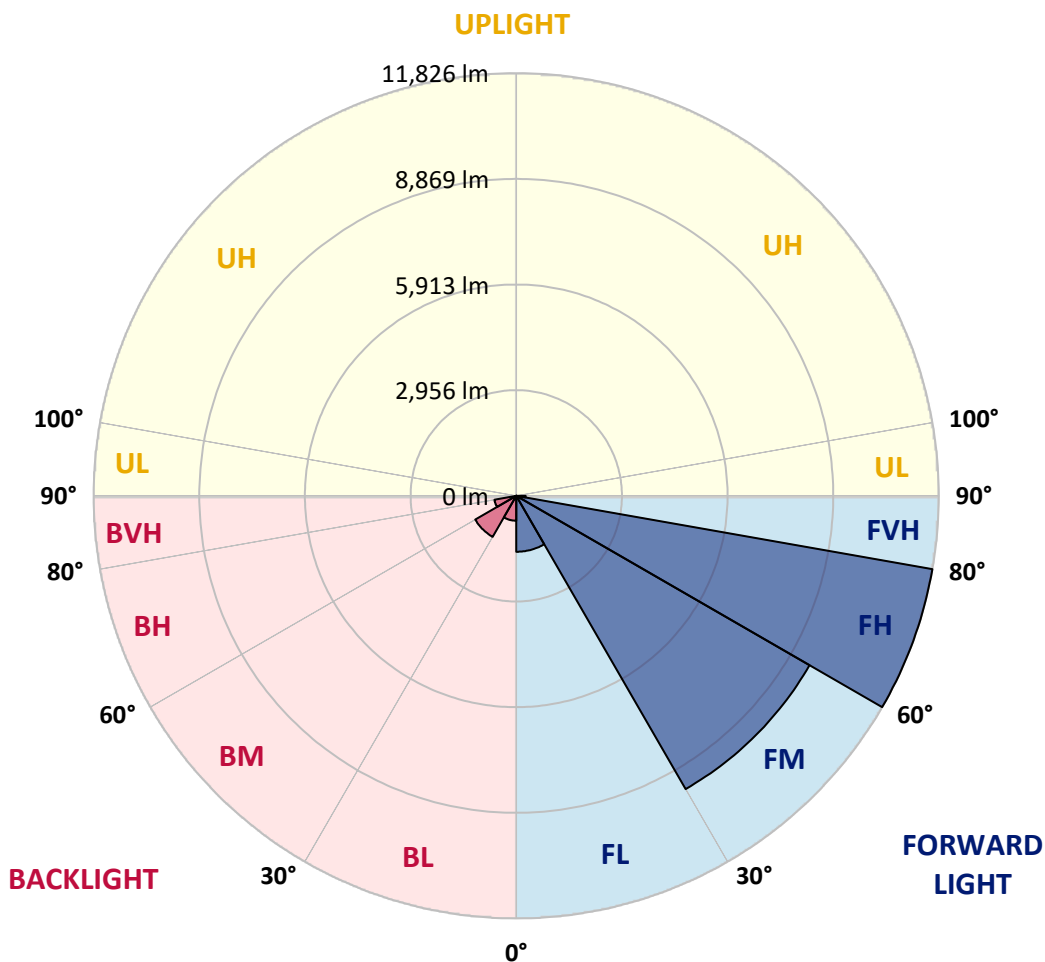


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|----------------|---------|-----------|-------------------------|------|----------|
|                |         |           | B                       | U    | G        |
| FL (0°-30°)    | 1566.0  | 6.1       |                         |      |          |
| FM (30°-60°)   | 9476.9  | 36.8      |                         |      |          |
| FH (60°-80°)   | 11825.8 | 45.9      |                         |      | G4/12000 |
| FVH (80°-90°)  | 258.4   | 1.0       |                         |      | G3/500   |
| BL (0°-30°)    | 697.1   | 2.7       | B2/1000                 |      |          |
| BM (30°-60°)   | 1325.4  | 5.1       | B2/2500                 |      |          |
| BH (60°-80°)   | 620.2   | 2.4       | B2/1000                 |      | G2/1000  |
| BVH (80°-90°)  | 2.2     | 0.0       |                         |      | G0/10    |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 46°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  | 2582.3  |
| 2.5°  | 2868.6  | 2865.0  | 2848.1  | 2840.8  | 2799.8  | 2775.6  | 2765.9  | 2735.7  | 2692.2  | 2648.7  | 2600.4  |
| 5°    | 3194.9  | 3193.7  | 3162.3  | 3132.1  | 3054.7  | 2982.2  | 2968.9  | 2898.8  | 2801.0  | 2709.1  | 2617.3  |
| 7.5°  | 3528.4  | 3512.7  | 3481.3  | 3423.3  | 3310.9  | 3194.9  | 3184.0  | 3084.9  | 2946.0  | 2813.1  | 2681.3  |
| 10°   | 3811.2  | 3801.5  | 3760.4  | 3672.2  | 3540.5  | 3408.8  | 3395.5  | 3273.4  | 3116.4  | 2953.2  | 2785.3  |
| 12.5° | 4031.1  | 4023.8  | 3969.5  | 3859.5  | 3719.3  | 3582.8  | 3564.7  | 3455.9  | 3287.9  | 3105.5  | 2907.3  |
| 15°   | 4165.2  | 4161.6  | 4095.1  | 3977.9  | 3840.2  | 3721.7  | 3706.0  | 3610.6  | 3454.7  | 3263.8  | 3040.2  |
| 17.5° | 4196.6  | 4197.8  | 4129.0  | 4010.5  | 3897.0  | 3812.4  | 3800.3  | 3727.8  | 3597.3  | 3407.6  | 3173.1  |
| 20°   | 4126.5  | 4141.0  | 4079.4  | 3976.7  | 3906.6  | 3861.9  | 3852.2  | 3808.7  | 3698.8  | 3519.9  | 3279.5  |
| 22.5° | 4027.5  | 4034.7  | 3992.4  | 3923.5  | 3894.5  | 3903.0  | 3898.2  | 3874.0  | 3780.9  | 3616.6  | 3384.6  |
| 25°   | 3967.0  | 3967.0  | 3941.7  | 3883.7  | 3903.0  | 3955.0  | 3956.2  | 3951.3  | 3877.6  | 3735.0  | 3512.7  |
| 27.5° | 3964.6  | 3957.4  | 3928.4  | 3884.9  | 3938.0  | 4017.8  | 4022.6  | 4055.2  | 4009.3  | 3878.8  | 3672.2  |
| 30°   | 4061.3  | 4052.8  | 3991.2  | 3934.4  | 4002.1  | 4087.9  | 4100.0  | 4171.2  | 4148.3  | 4034.7  | 3849.8  |
| 32.5° | 4287.2  | 4257.0  | 4120.5  | 4027.5  | 4078.2  | 4180.9  | 4196.6  | 4310.2  | 4346.5  | 4226.8  | 4021.4  |
| 35°   | 4596.6  | 4501.1  | 4304.2  | 4203.9  | 4208.7  | 4316.2  | 4330.8  | 4497.5  | 4605.0  | 4403.3  | 4154.3  |
| 37.5° | 5023.1  | 4976.0  | 4655.8  | 4387.5  | 4409.3  | 4572.4  | 4614.7  | 4796.0  | 4765.8  | 4499.9  | 4305.4  |
| 40°   | 5958.4  | 5884.7  | 5543.9  | 4902.3  | 4601.4  | 4780.3  | 4793.6  | 4890.2  | 4892.6  | 4718.6  | 4619.5  |
| 42.5° | 7232.0  | 7201.8  | 6842.9  | 5836.4  | 4979.6  | 4919.2  | 4943.4  | 5106.5  | 5289.0  | 5180.2  | 5175.4  |
| 45°   | 8642.2  | 8626.5  | 8245.8  | 7076.1  | 5744.5  | 5374.8  | 5405.0  | 5623.7  | 5972.9  | 5997.1  | 6150.5  |
| 47.5° | 9776.8  | 9769.6  | 9550.9  | 8459.7  | 6915.4  | 6146.9  | 6156.6  | 6388.6  | 7002.4  | 7305.7  | 7551.0  |
| 50°   | 10811.2 | 10846.2 | 10673.4 | 9956.9  | 8510.5  | 7356.5  | 7333.5  | 7488.2  | 8474.2  | 8970.8  | 9275.3  |
| 52.5° | 12249.1 | 12298.7 | 11814.1 | 11353.7 | 10184.0 | 8857.3  | 8839.1  | 9001.0  | 10243.2 | 10615.4 | 10669.8 |
| 55°   | 13519.1 | 13434.5 | 13051.5 | 12918.5 | 12224.9 | 10710.9 | 10706.0 | 10848.6 | 11954.3 | 12112.6 | 12212.9 |
| 57.5° | 14079.8 | 14047.1 | 14232.0 | 14536.5 | 14362.5 | 12901.6 | 12890.7 | 12782.0 | 13485.3 | 13502.2 | 13810.3 |
| 60°   | 14433.8 | 14473.7 | 15040.4 | 15979.3 | 16413.1 | 15259.1 | 15189.0 | 14525.7 | 14947.4 | 14909.9 | 15239.8 |
| 62.5° | 14168.0 | 14246.5 | 15266.4 | 16831.2 | 17947.7 | 17317.0 | 17217.9 | 16123.1 | 16196.8 | 16067.5 | 16374.4 |
| 65°   | 12756.6 | 12878.7 | 14549.8 | 16670.5 | 18709.0 | 18925.3 | 18825.0 | 17533.3 | 17188.9 | 16976.2 | 16805.8 |
| 67.5° | 10358.0 | 10430.5 | 12175.4 | 15272.4 | 18365.8 | 19884.7 | 19864.2 | 18769.4 | 17938.1 | 16822.7 | 15500.8 |
| 69°   | 8560.0  | 8631.3  | 10310.9 | 13800.6 | 17610.6 | 20090.1 | 20130.0 | 19165.7 | 17795.5 | 15889.9 | 13734.2 |
| 70°   | 7250.1  | 7326.3  | 8891.1  | 12539.1 | 16734.5 | 19994.7 | 20066.0 | 19128.3 | 17387.0 | 14809.6 | 12183.9 |
| 72.5° | 3802.7  | 3867.9  | 5473.9  | 8638.5  | 13642.3 | 18359.8 | 18576.1 | 17511.5 | 14738.3 | 10755.6 | 7204.2  |
| 75°   | 1195.1  | 1232.5  | 2137.6  | 4515.6  | 9340.6  | 14275.5 | 14325.1 | 13736.6 | 10465.6 | 5916.1  | 3000.3  |
| 77.5° | 455.6   | 444.7   | 711.7   | 1663.9  | 4722.3  | 8989.0  | 9292.3  | 8584.2  | 5492.0  | 2091.7  | 692.4   |
| 80°   | 245.3   | 246.5   | 369.8   | 688.8   | 2020.4  | 4619.5  | 4875.7  | 4160.4  | 1951.5  | 652.5   | 159.5   |
| 82.5° | 106.3   | 111.2   | 207.8   | 364.9   | 928.0   | 1703.8  | 1831.9  | 1524.9  | 745.6   | 438.6   | 59.2    |
| 85°   | 23.0    | 25.4    | 100.3   | 198.2   | 378.2   | 478.5   | 501.5   | 494.2   | 474.9   | 340.8   | 23.0    |
| 87.5° | 0.0     | 0.0     | 44.7    | 71.3    | 95.5    | 108.8   | 95.5    | 124.5   | 262.2   | 229.6   | 12.1    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P363357  
 CATALOG NUMBER: NVN-SA5C-760-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2582.3  | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 | 2582.3 |
| 2.5°  | 2584.7  | 2562.9 | 2525.5 | 2484.4 | 2455.4 | 2425.2 | 2401.0 | 2390.1 | 2378.0 | 2369.6 | 2380.5 |
| 5°    | 2579.8  | 2537.5 | 2465.0 | 2395.0 | 2344.2 | 2303.1 | 2269.3 | 2256.0 | 2242.7 | 2233.0 | 2231.8 |
| 7.5°  | 2622.1  | 2562.9 | 2451.8 | 2349.0 | 2270.5 | 2214.9 | 2169.0 | 2149.7 | 2134.0 | 2126.7 | 2120.7 |
| 10°   | 2703.1  | 2627.0 | 2478.3 | 2344.2 | 2242.7 | 2148.5 | 2049.4 | 1973.2 | 1923.7 | 1900.7 | 1892.3 |
| 12.5° | 2808.2  | 2712.8 | 2529.1 | 2369.6 | 2222.2 | 2040.9 | 1830.7 | 1649.4 | 1532.2 | 1493.5 | 1470.6 |
| 15°   | 2931.5  | 2813.1 | 2595.5 | 2402.2 | 2147.2 | 1816.2 | 1459.7 | 1222.9 | 1114.1 | 1092.4 | 1068.2 |
| 17.5° | 3049.9  | 2919.4 | 2675.3 | 2408.3 | 1982.9 | 1451.2 | 1069.4 | 908.7  | 866.4  | 880.9  | 884.5  |
| 20°   | 3153.8  | 3024.5 | 2753.8 | 2355.1 | 1684.4 | 1088.7 | 827.7  | 787.8  | 803.6  | 831.3  | 836.2  |
| 22.5° | 3258.9  | 3126.0 | 2826.3 | 2214.9 | 1302.6 | 826.5  | 745.6  | 755.2  | 770.9  | 798.7  | 803.6  |
| 25°   | 3387.0  | 3249.3 | 2894.0 | 1957.5 | 977.6  | 703.3  | 708.1  | 722.6  | 738.3  | 763.7  | 766.1  |
| 27.5° | 3534.4  | 3405.1 | 2938.7 | 1622.8 | 725.0  | 646.5  | 662.2  | 683.9  | 699.6  | 723.8  | 728.6  |
| 30°   | 3730.2  | 3610.6 | 2953.2 | 1276.0 | 607.8  | 595.7  | 603.0  | 629.6  | 652.5  | 674.3  | 677.9  |
| 32.5° | 3913.9  | 3813.6 | 2904.9 | 963.1  | 563.1  | 548.6  | 548.6  | 564.3  | 590.9  | 611.4  | 616.3  |
| 35°   | 4083.0  | 4017.8 | 2750.2 | 704.5  | 529.3  | 505.1  | 493.0  | 493.0  | 509.9  | 526.8  | 531.7  |
| 37.5° | 4306.6  | 4304.2 | 2500.1 | 561.9  | 496.6  | 468.8  | 443.5  | 424.1  | 418.1  | 421.7  | 424.1  |
| 40°   | 4689.6  | 4693.3 | 2173.8 | 503.9  | 468.8  | 431.4  | 392.7  | 357.7  | 325.0  | 314.2  | 313.0  |
| 42.5° | 5287.8  | 5233.4 | 1831.9 | 476.1  | 444.7  | 392.7  | 334.7  | 287.6  | 236.8  | 221.1  | 219.9  |
| 45°   | 6237.5  | 5914.9 | 1469.4 | 450.7  | 419.3  | 349.2  | 276.7  | 212.7  | 171.6  | 159.5  | 159.5  |
| 47.5° | 7621.1  | 6810.3 | 1138.3 | 422.9  | 385.5  | 299.7  | 209.0  | 153.5  | 125.7  | 119.6  | 120.8  |
| 50°   | 9051.8  | 7687.6 | 872.4  | 387.9  | 344.4  | 247.7  | 154.7  | 111.2  | 95.5   | 95.5   | 96.7   |
| 52.5° | 10320.6 | 8330.4 | 680.3  | 350.4  | 293.6  | 194.5  | 117.2  | 87.0   | 79.8   | 78.5   | 79.8   |
| 55°   | 11508.4 | 8744.9 | 520.8  | 306.9  | 233.2  | 145.0  | 89.4   | 71.3   | 66.5   | 64.0   | 62.8   |
| 57.5° | 12653.9 | 8950.3 | 390.3  | 247.7  | 169.2  | 105.1  | 71.3   | 60.4   | 55.6   | 52.0   | 50.8   |
| 60°   | 13416.4 | 8783.5 | 268.3  | 182.5  | 117.2  | 76.1   | 59.2   | 52.0   | 45.9   | 42.3   | 41.1   |
| 62.5° | 13846.6 | 8328.0 | 172.8  | 131.7  | 83.4   | 56.8   | 47.1   | 43.5   | 35.0   | 31.4   | 31.4   |
| 65°   | 13672.6 | 7576.4 | 120.8  | 94.3   | 60.4   | 42.3   | 35.0   | 35.0   | 25.4   | 20.5   | 19.3   |
| 67.5° | 12116.2 | 6400.7 | 91.8   | 70.1   | 43.5   | 31.4   | 26.6   | 30.2   | 15.7   | 9.7    | 9.7    |
| 69°   | 10424.5 | 5304.7 | 78.5   | 58.0   | 36.3   | 25.4   | 23.0   | 27.8   | 10.9   | 7.3    | 6.0    |
| 70°   | 9060.3  | 4576.0 | 71.3   | 50.8   | 30.2   | 21.8   | 20.5   | 26.6   | 10.9   | 6.0    | 4.8    |
| 72.5° | 5420.7  | 2552.0 | 54.4   | 36.3   | 19.3   | 16.9   | 16.9   | 30.2   | 10.9   | 6.0    | 4.8    |
| 75°   | 2190.8  | 899.0  | 39.9   | 25.4   | 14.5   | 14.5   | 20.5   | 38.7   | 9.7    | 4.8    | 3.6    |
| 77.5° | 496.6   | 197.0  | 23.0   | 15.7   | 9.7    | 14.5   | 24.2   | 30.2   | 6.0    | 2.4    | 0.0    |
| 80°   | 120.8   | 48.3   | 14.5   | 9.7    | 6.0    | 10.9   | 18.1   | 16.9   | 1.2    | 0.0    | 0.0    |
| 82.5° | 39.9    | 16.9   | 6.0    | 4.8    | 1.2    | 3.6    | 8.5    | 4.8    | 0.0    | 0.0    | 0.0    |
| 85°   | 16.9    | 9.7    | 2.4    | 1.2    | 0.0    | 0.0    | 1.2    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 10.9    | 3.6    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-760-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 5474   | CRI (Ra): | 71.7 | R9:  | -27.1 |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R10: | 40.8  |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R11: | 74.6  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R12: | 50.4  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R13: | 70.0  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R14: | 87.8  |
| CIE z:                    | 0.3204 | R6:       | 67.5 |      |       |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) |
|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|-------------------|------------------------|-------------------------|
| 360               | 3540                   | NR                      | 490               | 33363                  | NR                      | 620               | 80193                  | NR                      | 750               | 4663                   | NR                      | 880               | 4678                   | NR                      |
| 365               | 2862                   | NR                      | 495               | 44177                  | NR                      | 625               | 73091                  | NR                      | 755               | 4147                   | NR                      | 885               | 4128                   | NR                      |
| 370               | 2865                   | NR                      | 500               | 57019                  | NR                      | 630               | 66269                  | NR                      | 760               | 4040                   | NR                      | 890               | 4504                   | NR                      |
| 375               | 3254                   | NR                      | 505               | 70030                  | NR                      | 635               | 60012                  | NR                      | 765               | 3474                   | NR                      | 895               | 4371                   | NR                      |
| 380               | 3076                   | NR                      | 510               | 81972                  | NR                      | 640               | 53914                  | NR                      | 770               | 3469                   | NR                      | 900               | 4082                   | NR                      |
| 385               | 2904                   | NR                      | 515               | 92590                  | NR                      | 645               | 48385                  | NR                      | 775               | 3181                   | NR                      | 905               | 2982                   | NR                      |
| 390               | 2689                   | NR                      | 520               | 100305                 | NR                      | 650               | 43219                  | NR                      | 780               | 2969                   | NR                      | 910               | 4351                   | NR                      |
| 395               | 2619                   | NR                      | 525               | 107452                 | NR                      | 655               | 38562                  | NR                      | 785               | 3132                   | NR                      | 915               | 3365                   | NR                      |
| 400               | 2679                   | NR                      | 530               | 111373                 | NR                      | 660               | 34110                  | NR                      | 790               | 2507                   | NR                      | 920               | 3430                   | NR                      |
| 405               | 3515                   | NR                      | 535               | 114505                 | NR                      | 665               | 30085                  | NR                      | 795               | 2968                   | NR                      | 925               | 4264                   | NR                      |
| 410               | 6934                   | NR                      | 540               | 116408                 | NR                      | 670               | 26205                  | NR                      | 800               | 2758                   | NR                      | 930               | 4095                   | NR                      |
| 415               | 14943                  | NR                      | 545               | 118700                 | NR                      | 675               | 22906                  | NR                      | 805               | 2872                   | NR                      | 935               | 5048                   | NR                      |
| 420               | 31939                  | NR                      | 550               | 119209                 | NR                      | 680               | 20058                  | NR                      | 810               | 3094                   | NR                      | 940               | 4074                   | NR                      |
| 425               | 64701                  | NR                      | 555               | 120742                 | NR                      | 685               | 17413                  | NR                      | 815               | 3222                   | NR                      | 945               | 4949                   | NR                      |
| 430               | 110939                 | NR                      | 560               | 121594                 | NR                      | 690               | 15447                  | NR                      | 820               | 3238                   | NR                      | 950               | 4387                   | NR                      |
| 435               | 164597                 | NR                      | 565               | 121913                 | NR                      | 695               | 13398                  | NR                      | 825               | 3524                   | NR                      | 955               | 4978                   | NR                      |
| 440               | 207696                 | NR                      | 570               | 122147                 | NR                      | 700               | 11777                  | NR                      | 830               | 2921                   | NR                      | 960               | 4706                   | NR                      |
| 445               | 201830                 | NR                      | 575               | 121605                 | NR                      | 705               | 10412                  | NR                      | 835               | 3595                   | NR                      | 965               | 5083                   | NR                      |
| 450               | 145410                 | NR                      | 580               | 120248                 | NR                      | 710               | 9544                   | NR                      | 840               | 3016                   | NR                      | 970               | 4522                   | NR                      |
| 455               | 89594                  | NR                      | 585               | 117717                 | NR                      | 715               | 8940                   | NR                      | 845               | 4032                   | NR                      | 975               | 4740                   | NR                      |
| 460               | 58321                  | NR                      | 590               | 114359                 | NR                      | 720               | 7897                   | NR                      | 850               | 3579                   | NR                      | 980               | 6122                   | NR                      |
| 465               | 39318                  | NR                      | 595               | 109974                 | NR                      | 725               | 7045                   | NR                      | 855               | 4571                   | NR                      | 985               | 6450                   | NR                      |
| 470               | 27693                  | NR                      | 600               | 105269                 | NR                      | 730               | 6483                   | NR                      | 860               | 4485                   | NR                      | 990               | 4875                   | NR                      |
| 475               | 23081                  | NR                      | 605               | 99453                  | NR                      | 735               | 5838                   | NR                      | 865               | 3978                   | NR                      | 995               | 4764                   | NR                      |
| 480               | 23002                  | NR                      | 610               | 92921                  | NR                      | 740               | 5261                   | NR                      | 870               | 4298                   | NR                      | 1000              | 3640                   | NR                      |
| 485               | 26201                  | NR                      | 615               | 86989                  | NR                      | 745               | 4760                   | NR                      | 875               | 4356                   | NR                      |                   |                        |                         |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**





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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)